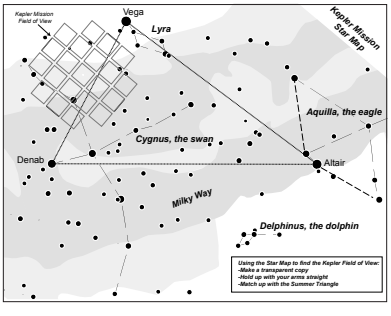
How to Use This Poster

This poster illustrates the story of the NASA *Kepler Mission*. It shows the *Kepler* spacecraft's position in our solar system relative to the Earth, Sun and other planets. The *Kepler* spacecraft observes a portion of our Milky Way Galaxy to monitor stars for transits. The outlined squares show the area of the sky (field of view) that *Kepler* observes to search for transits over the life-time of the mission. Star maps of the *Kepler* field of view are available on the project website, **http://kepler.nasa.gov/ed/starwheel**

This side of the poster provides information about NASA's *Kepler Mission* and classroom-tested educational activities. The poster is designed so that each panel can be copied onto 8 ½ inch by 11 inch paper on a standard copier. All of the panels that appear here are also available at the *Kepler Mission* website as PDF files that can be downloaded and printed. The panels are:

- ***Kepler's* Search: Are There Habitable Planets Beyond Our Solar System:** a 2-panel background article on the *Kepler Mission*. More detailed and extensive information is available at the *Kepler Mission* website **: http://kepler.nasa.gov**.
- **How to Use This Poster:** General information, science education standards, credits, and further resources.
- **Detecting Extrasolar Planets:** Students construct and demonstrate transit models to learn about the search for extrasolar planets using the transit detection method.
- **Human Powered Orrery:** Students model the orbits of planets around the Sun to understand the speed and position of planets in the solar system in a kinesthetic activity.
- **Investigation: Transit Tracks:** Students learn about transits, how a planet's size and distance from its star affect the transit, and how to interpret light curves to deduce information about extrasolar planetary systems.

Additional materials that extend these lessons are available on the *Kepler Mission* website, such as the downloadable image files below.



"Uncle Al's Star Wheel" for star gazing, and a star map for finding *Kepler*'s field of view.

Science Education Standards

Detecting Extrasolar Planets and **Human-Powered Orrery** support the following *National Science Education Standards (NSES)* National Academy Press, 1996. and *AAAS Benchmarks for Science Literacy (Benchmarks)* Oxford University Press 1993:

- ***NSES* Grades 5 – 8:** Content Standard D: Earth and Space Science: Earth in the Solar System: "Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses."
- ***NSES* Grades 5 – 8:** Content Standard A: Science as Inquiry: Understandings About Scientific Inquiry: "Different kinds of investigations suggest different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms or events; some involve collecting specimens; some involve experiments; some involve seeking more information: some involve discovery of new objects and phenomena; and some involve making models."
- ***Benchmarks* Grades 6 – 8:** The Earth: "We live on a relatively small planet, the third from the sun in the only system of planets definitely known to exist (although other similar solar systems may be discovered in the universe.)"
- ***Benchmarks* Grades 6 – 8:** Models: "Different models can be used to represent the same thing…Choosing a useful model is one of the instances in which intuition and creativity come into play in science, mathematics, and engineering."

Investigation: Transit Tracks and the extension **Going Further – Optional Activities** support the following standards:

- ***NSES* Grades 9 – 12:** Content Standard A: Science as Inquiry: Understandings About Scientific Inquiry: "Scientists rely on technology to enhance the gathering and manipulation of data. New techniques and tools provide new evidence to guide inquiry and new methods to gather data, thereby contributing to the advance of science. The accuracy and precision of the data, and therefore the quality of the exploration, depends on the technology used."
- ***NSES* Grades 9 – 12:** Content Standard A: Science as Inquiry: Understandings About Scientific Inquiry: "Mathematics is essential in scientific inquiry. Mathematical tools and models guide and improve the posing of questions, gathering data, constructing explanations and communicating results."

Credits

The *Kepler Mission* Education and Public Outreach program is conducted for NASA by a team that includes Dr. David Koch, Deputy Principal Investigator for the *Kepler Mission*, Alan Gould of Lawrence Hall of Science, Edna DeVore and Pamela Harman of the SETI Institute, and Wendy Stenzel, *Kepler Mission* science communications and graphic design.

The Human Powered Orrery and Detecting Extrasolar Planets are adapted from the Great Explorations in Math and Science (GEMS) Space Science Sequence for grades 6-8. http://lhsgems.org/CurriculumSequences.htm. Investigation: Transit Tracks is adapted from Full Option Science (FOSS) Planetary Science course http://www.fossweb.com/modulesMS/PlanetaryScience. Both are from the Lawrence Hall of Science.

The *Kepler Mission* poster can be downloaded at http://kepler.nasa.gov